ADULT BLOOD LEAD EPIDEMIOLOGY & SURVEILLANCE IN NEW JERSEY 1986 - 1996

Report Prepared by:

Barbara Gerwel, M.D.
Marion Pearson
Rukmani Ramaprasad, M.Sc., M.S.
Martha Stanbury, M.S.P.H.
David Valiante, M.S., CIH

Occupational Disease Epidemiology and Surveillance Program

❖

Elin A. Gursky, Sc.D.
Senior Assistant Commissioner

James S. Blumenstock
Assistant Commissioner

Kathleen O'Leary, M.S., Director
Occupational Disease and Injury Services

❖

New Jersey Department of Health and Senior Services
Division of Environmental and Occupational Health
Occupational Disease and Injury Services
P.O. Box 360
Trenton, N.J. 08625-0360
(609) 984-1863

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Dave Martin
Lisa M. Roche, M.P.H., Ph.D.
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Devendra Singh, CIH

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INTRODUCTION

Lead has adverse health effects on the central and peripheral nervous, hematologic, cardiovascular, renal, and reproductive systems.[1] Since 1981, 26 states have established lead registries for surveillance of adult lead absorption, primarily based on reports of elevated blood lead levels (BLL) from clinical laboratories. Data from these surveillance systems show that occupational lead toxicity is an important public health problem in the United States.[2] In addition, several studies have found that occupational lead registries may significantly underestimate the prevalence of this problem.[3,4]

The adverse health effects of lead are monitored by the New Jersey Department of Health and Senior Services (NJDHSS) by reporting of individuals with BLL $\geq$25 µg/dl. The NJDHSS established an occupational lead surveillance system, now named Adult Blood Lead Epidemiology and Surveillance (ABLES) based on two regulations. The first regulation, in effect since October 1985, requires clinical laboratories to report BLL $\geq$25 µg/dl to the NJDHSS. The second regulation, in effect since May 1990, requires physicians to report lead toxicity. The sources of lead exposure for reported individuals are identified through these reports.

Prevention of adverse health effects from exposure to lead at work is accomplished by the NJDHSS by:

- Providing educational materials, medical consultations, and technical assistance to lead exposed individuals, their employers and physicians;
- Evaluating lead exposure at workplaces;
- Making referrals to regulatory agencies for enforcement of health standards;
- Publishing surveillance data on adult lead exposure to assist stakeholders and policy makers in developing public health priorities and targeting prevention programs.

This report describes trends in ABLES data for the period 1986 through 1996. It also provides information from interviews of workers with BLL 40 µg/dl and greater, and describes some of the NJDHSS interventions with employers. Previous NJDHSS reports on ABLES include a 1993 report for data and programs from 1985 through 1991[5] and a 1995 report for data and programs through 1993.[6]

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Methods

Using standardized forms, laboratories and physicians report the name, address, telephone number, sex, and date of birth of the tested individual, date and result of blood lead level, the name of the laboratory, name and address of employer, and, for laboratories, the name and address of requesting physician. Follow-up telephone calls are made to laboratories, physicians, and employers to obtain information often missing from the reports. All data are computerized in three major data base files. Reporting by laboratories began in October 1985. Because of incomplete data for 1985, reports received in that year are not included in the following analysis except when the individuals reported in 1985 were also reported in subsequent years.

Results

Between January 1, 1986, and December 31, 1996, the NJDHSS received 25,021 reports of BLL≥25 µg/dl from laboratories and physicians on 5,009 individuals over 16 years of age. Ninety-eight percent of the reports were from laboratories. The sources of lead exposure were occupational for 4,011 cases, nonoccupational for 151 cases, and undetermined for the remaining 847 reported individuals. (Table 1)

Table 1
Number of Reports[1] and Cases[1] Reported to NJDHSS
January 1, 1986 - December 31, 1996

Exposure	# of Reports	# of Cases
Occupational	23,456	4,011[2]
Nonoccupational	517	151
Unknown[3]	1,048	847
Total	**25,021**	**5,009**

[1]Reports with BLL ≥25 µg/dl
[2]Includes individuals first identified in 1985 with BLL reports in subsequent years
[3]Exposure unknown - may or may not have been occupational

Annual Trends in Numbers of Reports, Cases, Workplaces

Table 2 presents the annual numbers of reports, reported cases, new cases, and workplaces identified from reporting for January 1, 1986, through December 31, 1996. *Reported cases* and *workplaces* were counted once in each year they were reported; the same individual and same workplace could be counted again in subsequent years. The *new cases* were only counted once, in the year they were first identified.

The number of *reports* was highest in 1989; followed by a steady decline. The number of reported cases peaked at 1,154 in 1990, then also declined. The number of *new cases* peaked in 1988, followed by lesser peaks in 1993 and 1996. The number of *workplaces* identified each year fluctuated moderately over the 11-year period, with as many workplaces being identified in 1996 as in some earlier years of the surveillance system.

Table 2
Reporting Trends: January 1, 1986 - December 31, 1996

Year	# of Reports	# of Cases[1]	# of New Cases[2]	# of Workplaces[3]
1986	1,124	687	618	95
1987	687	415	227	95
1988	1,927	951	671	123
1989	4,294	1,054	473	127
1990	4,134	1,154	465	118
1991	3,255	881	271	112
1992	1,964	724	261	119
1993	1,831	704	305	109
1994	1,769	644	221	96
1995	1,282	548	181	99
1996	1,189	534	218	123
Total	**23,456**		**4,011[4]**	

[1]Number of cases per year (counted once each reported year)
[2]Number of new cases first identified (counted only once between 1986-1996)
[3]Number of workplaces with known SIC codes per year (counted once each reported year)
[4]Includes 101 individuals first identified in 1985 with BLL reports in subsequent years

Impact of Two Companies on Trends

Two large manufacturing companies together contributed 54% of the reports and 17% of the total volume of cases. One of the two companies, a large battery manufacturer, represented over 50% of all blood lead reports and over 21% of reported individuals annually in the ABLES system between 1989 and 1992. However, due in part to a change in company policy on the frequency of testing in the early 1990's, the number of reports and cases from this company declined in more recent years. The second company, a large chemical plant, represented approximately 22% of all blood lead reports and up to 23% of cases annually in the late 1980's. This company ceased using lead in its New Jersey location in 1991; a few workers involved in clean up at the facility continued to be reported annually through 1996. (Table 3)

Trends in Major Industry Groups

Reported cases from all other companies in the manufacturing sector showed a peak in 1990 similar to that of the two large companies, followed by a moderate decline through 1996. By contrast, the number of cases reported from the construction industry rose until peaking in 1993, the year when the OSHA lead in construction standard went into effect and shortly after the New Jersey Department of Transportation's lead safety contract language for bridge construction contractors was developed. There was another rise in the number of reports from construction in 1996, following implementation of a law requiring licensing of lead abatement workers and certification of lead abatement contractors. (Table 3)

Table 3
Number of Cases by Reporting Year and Selected Industry Groups
1986-1996

Year	Battery Plant	Chemical Plant	Other Manufacturing	Construction Industry	All Other Industries	Total*
1986	1	27	606	21	32	687
1987	7	90	258	34	25	415
1988	203	160	472	55	59	951
1989	248	246	450	57	52	1,054
1990	248	197	558	94	56	1,154
1991	238	119	402	83	38	881
1992	187	12	353	137	33	724
1993	149	5	262	261	26	704
1994	163	3	312	148	17	644
1995	141	3	236	150	18	548
1996	89	3	208	195	31	534

*Includes 16 cases of occupational exposure, unknown SIC codes

Industrial Classifications: Workplace and Reported Individuals

Table 4 presents the numbers of individuals and workplaces, each counted once rather than once each year, by industry type, which were identified in the 11-year time period. (Table 4 only includes the 4,002 individuals for whom work site was identified by name.) The construction industry

Table 4
Workplaces and Cases by Industry
January 1, 1986 - December 31, 1996

SIC*	Industry	# of Workplaces	# of Cases
15-17	Construction	191	906
28	Chemicals and allied products	45	779
30	Rubber and miscellaneous plastics products	8	49
32	Stone, clay, glass and concrete products	18	302
33	Primary metal industries	41	861
34	Fabricated metal products	14	85
35	Industrial and commercial machinery	13	50
36	Electronic and other electrical equipment	15	650
48,50	Communications and wholesale trade-durable goods	21	74
75	Automotive repair, services, and parking	29	51
	All other SIC codes	95	188
	Work sites with unknown SIC codes	5	7
	Total	**495**	**4,002****

*Standard Industrial Classification

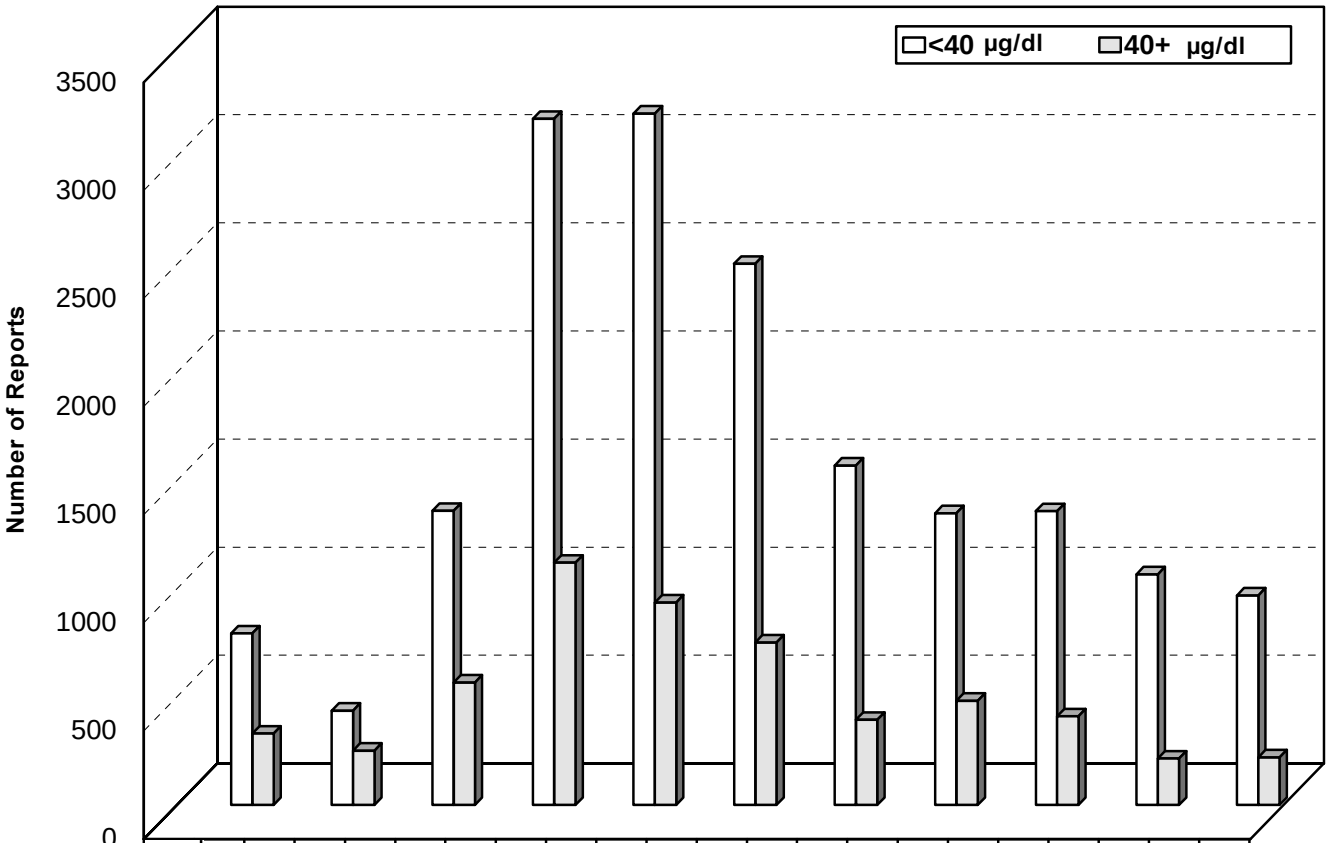
**Nine individuals who had occupational exposure but whose workplace was not identified are excluded

Trends in Blood Lead Levels

Figure 1 shows the annual number of blood lead reports in two groups, those with BLL <40 µg/dl and those with BLL ≥40 µg/dl. The proportion of reports where BLL were ≥40 µg/dl declined from a high of 36% in 1987 to a low of 17% in 1995, except for a rise to 26% in 1993, which is associated with an increase in reporting from workers in the construction industry.

Figure 1

Distribution of *Reports* by BLL <40 µg/dl and ≥40 µg/dl
January 1, 1986 - December 31, 1996

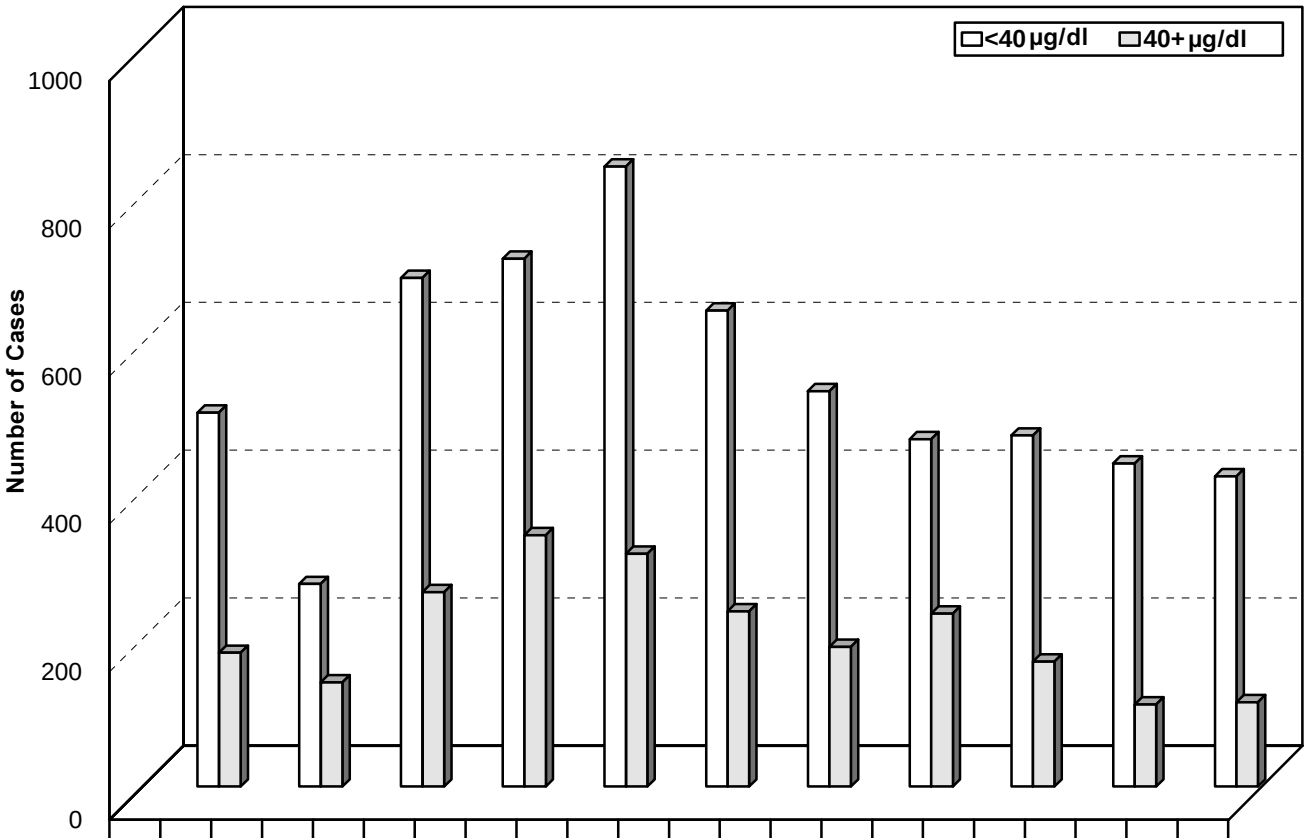


Year		86	87	88	89	90	91	92	93	94	95	96
<40 µg/dl	%	71	64	71	74	77	77	80	74	77	83	81
40+ µg/dl	%	29	36	29	26	23	23	20	26	23	17	19

Figure 2 shows a similar pattern for the peak annual blood lead levels of individuals.

Figure 2

Distribution of *Cases* by Peak BLL <40 µg/dl and ≥40 µg/dl
January 1, 1986 - December 31, 1996

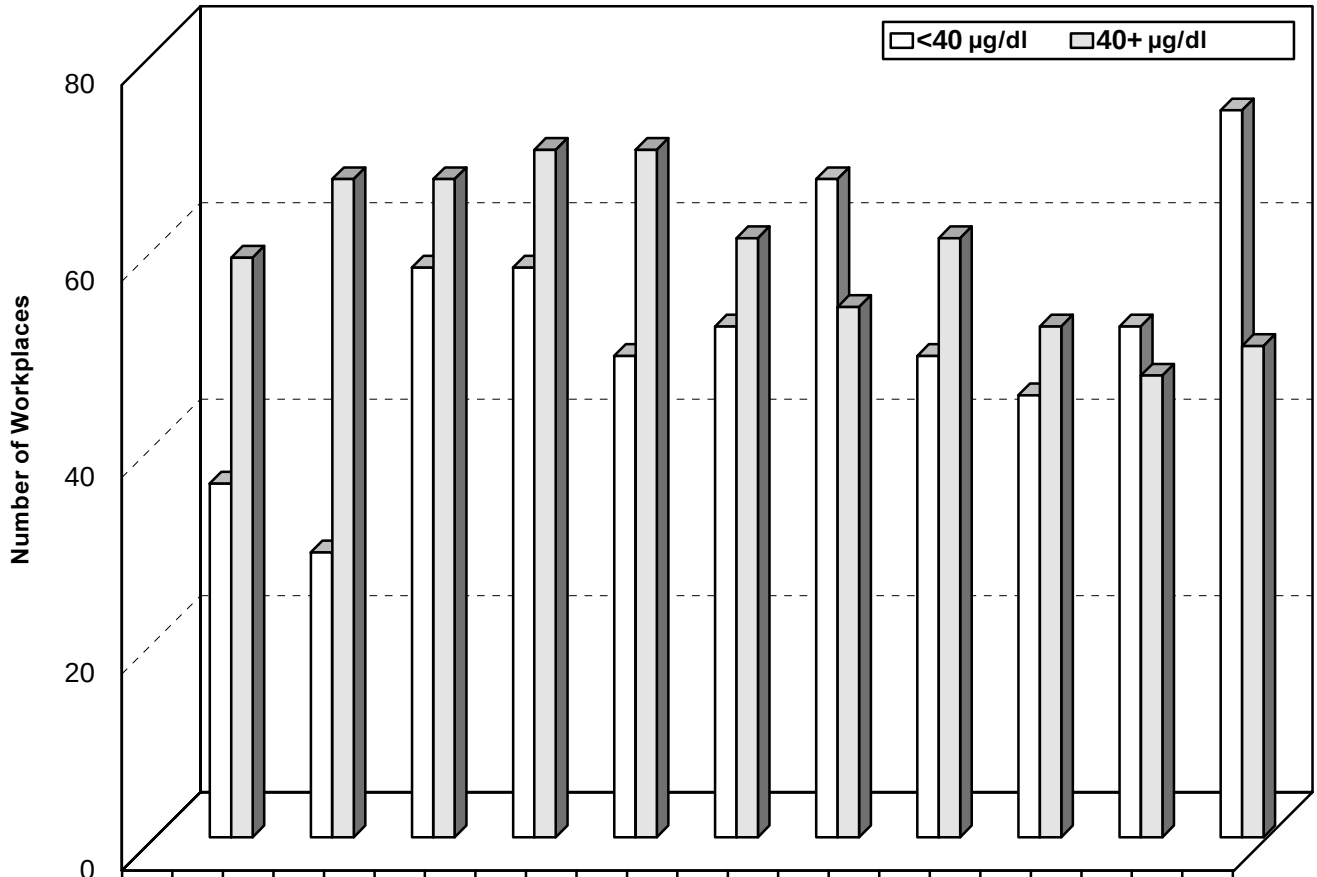


	Year	86		87		88		89		90		91		92		93		94		95		96
<40 µg/dl	%	74		66		72		68		73		73		74		67		74		80		79
40+ µg/dl	%	26		34		28		32		27		27		26		33		26		20		21

Whereas 62% of the workplaces identified in 1986 were associated with at least one worker with a BLL ≥40 µg/dl, by 1996 only 40% of the workplaces had at least one worker reported with BLL ≥40 µg/dl. (Figure 3)

Figure 3

Distribution of *Workplaces* by Peak BLL <40 µg/dl and ≥40 µg/dl
January 1, 1986 - December 31, 1996



Year		86	87	88	89	90	91	92	93	94	95	96
<40 µg/dl	%	38	30	46	45	41	46	55	45	46	53	60
40+ µg/dl	%	62	70	54	55	59	54	45	55	54	47	40

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Methods

Individuals are interviewed the first time they are reported with a blood lead level ≥40 µg/dl. The purpose of the interview is to identify the source of lead exposure and to ensure that the individual is aware of the lead hazard, appropriate workplace controls, practices, personal protective equipment, hygiene facilities, and medical care. The questionnaire in use between 1990 and 1994, the results of which are discussed below, obtained information on demographics (age, race/ethnicity, primary language), lead exposure (industry, occupation, duration of exposure, perceived reasons for elevated blood lead level), industrial hygiene work practices (availability of respirators, lunch rooms, showers, and other hygiene facilities), and medical surveillance/biological monitoring at the workplace.

Written questionnaires are sent to individuals when telephone numbers are unavailable. For individuals who do not speak English, interviews are conducted in their language.

Results of interviews are coded and data entered. Coding for "occupation" uses the system of the U.S. Bureau of Census and coding of "industry" uses the Standard Industrial Classification system.

Packages of educational materials are sent to individuals after the interview. These materials include information bulletins for:

- ***Workers*** exposed to lead, addressing adverse health effects of lead toxicity and prevention of lead poisoning;
- ***Contractors & workers*** concerning lead paint hazards and recent regulations for certification of lead abatement workers and licensing of lead abatement contractors; and
- ***Families*** of lead-exposed workers.

Medical consultations are provided over the telephone concerning adverse health symptoms caused by lead exposure and available medical care. A list of physicians specialized in occupational medicine is provided upon request. Serious cases of lead exposure are referred for diagnosis and treatment to the New Jersey Poison Information and Education System.

Physicians of individuals with blood lead levels ≥50 µg/dl are mailed educational materials about medical management of occupational lead toxicity and either interviewed by telephone or sent a self-administered questionnaire.

Results - Worker Interviews

One thousand four-hundred twenty-six individuals were reported with blood lead levels ≥40 µg/dl and 901 (63%) of these individuals completed the interview. Success in completing the interview was greatest for those individuals with blood lead levels greater than 60 µg/dl. (Table 5)

Table 5
Individuals Eligible for Interview and Interviewed
January 1, 1986 - December 31, 1996

Blood Lead Level (µg/dl)	Eligible	Interviewed
40 - 49	812	475 (58%)
50 - 59	361	239 (66%)
60 +	253	187 (74%)
Total	**1,426**	**901 (63%)**

Among the 901 workers who were interviewed, 416 (46%) were interviewed using the questionnaire in effect from 1990 to 1994*. Eighty-four (20%) of these 416 interviews were with workers from one company, the battery plant (discussed on page 5). Because their employment was unique and different from the rest of the interviewed individuals, the results of their interviews are presented separately, following the results of the 332 other interviews.

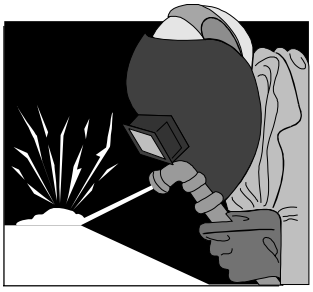
Demographics

By **gender**, 324 (98%) of the 332 interviewed workers were male. By **race/ethnicity**, 104 (31%) were minorities (13% black, 11% Hispanic and 7% other). Two hundred and forty-five (74%) reported English as their primary language. By **age**, 272 (82%) were 25-54 years old when reported for the first time with a blood lead level ≥40 µg/dl. One hundred eighty-seven (56%) had a **blood lead level** in the range 40-49 µg/dl. The remaining 145 (44%) had a blood lead level ≥50 µg/dl.

*The interview instruments in use before 1990 and after 1994 were incompatible across some variables and, therefore, were not included in the analysis that follows.

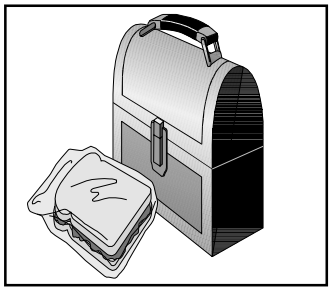
Work Site Characteristics

One hundred seventy-seven (53%) workers reported that their employer was a **contractor.** One hundred and ninety-two (58%) indicated that their workplace had a union and 151 (46%) workers were **union members**. By **duration of lead exposure** at current job, 121 (36%) had been exposed for less than one year, 115 (35%) had been exposed for one to five years, and 96 (29%) had been exposed for more than five years. When asked about their **reason for their elevated blood lead level**, 264 (80%) said that the workplace was dusty; 110 (33%) said the respirator was inadequate; 129 (39%) felt that eating and smoking at the worksite were responsible; and, 114 (34%) said that the ventilation was inadequate. (Percentages do not add to 100 because an individual could have chosen more than one reason.)



Industrial Hygiene/Work Practices

One hundred and seventy-two (52%) workers reported that they used **uniforms** provided by the employer. One hundred and seventy-eight (54%) indicated that their **work clothes** were **cleaned** five times a week. With respect to the location for cleaning work clothes, 157 (47%) said they were cleaned "at work," 146 (44%) indicated "at home," 22 (7%) used disposable uniforms, and for seven (2%) cleaning was unknown. One hundred and twenty-nine (39%) reported availability of a **lunchroom**; 152 (46%) said that they have a **shower facility** at work; and 74 (44%) among 170 **smokers** smoked in the work area. A total of 282 (85%) reported availability of **respirator**; while 241 (73%) claimed regular respirator use.



Medical Surveillance

Two hundred and ninety-six (89%) workers were **notified** of their blood lead level, a majority (210 - 63%) by the employer. One hundred and sixty-four (49%) **saw a physician** regarding their blood lead level. Eighty-one (49% of 164) saw their private physician, while 42 (26%) saw a physician employed or contracted by the employer. The remaining 41 (25%) saw some other physician. By **type of treatment** received, 79 (48% of 164) indicated "none;" 39 (24%) were medically removed; two (1%) were hospitalized; four (2%) were chelated at the hospital; 21 (12%) received oral chelation, and the remaining 21 (13%) received other treatment.

Occupation and Industry

A total of 56 occupations were represented. Occupations representing four percent or more of the cases are presented in Table 6. The two most frequently reported **occupations** were in construction (painters and sandblasters), together comprising 31% of those interviewed.

Table 6
Interviewed Workers by Occupation
June 1, 1990 - March 31, 1994

Occupation	# of Workers	Percent
Painter	54	16
Construction - Sandblaster	49	15
Structural Steel Worker	38	11
Furnace, Kiln, Oven Operator	20	6
Construction - Laborer	17	5
Other (each with less than 4% of interviewed workers)	154	46
Total	**332**	**100**

The interviewed workers worked at 129 different workplaces, of which 55 (43%) were from the construction industry, 52 (40%) were from the manufacturing sector, and the remaining (22 - 17%) from all other industry groups.

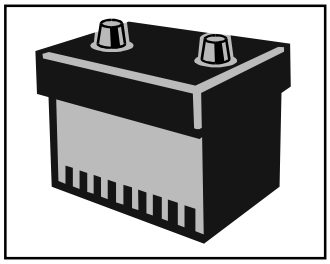
By industry, 23 industry groups were represented among interviewed workers (Table 7). Construction predominated as the industry of those interviewed (55%).

Table 7
Interviewed Workers by Industry
June 1, 1990 - March 31, 1994

Industry	# Workers	Percent
Construction, Special Trades Contractor (SIC 17)	140	42
Other Construction (SIC 15, 16)	43	13
Chemicals and Allied Products (SIC 28)	27	8
Primary Metals (SIC 33)	58	18
Others	64	19
Total	**332**	**100**

Battery Manufacturing Plant

Data from the interviews of the 84 workers from the battery manufacturing plant were significantly different from data provided by the other 332 interviewed workers. Results of these worker interviews significantly differed from the results presented above with respect to gender (14% compared to 2% female), minorities (46% compared to 31%), proportion interviewed with blood lead levels in the range 40-49 µg/dl (87% compared to 56%), union membership (98% unionized compared to 46%), duration of exposure to lead (67% exposed six or more years compared to 29%), and cleaning of work clothes "at home" (70% compared to 44% among others interviewed). These differences may be due to particular characteristics of the workforce and the occupational health program at this plant.



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WORKPLACE INTERVENTION

Methods

All employers identified through laboratory/physician reports and case interviews are traced to determine whether there is potential for on-going lead exposure in co-workers in New Jersey. This determination is based on information collected from interviews of employers, periodic mailed surveys of employers, and monthly monitoring of employees' blood lead levels. (Interviewing of all newly identified employers with workers having blood lead levels $\geq$40 µg/dl began in 1990 and interviewing of all newly identified employers, regardless of employee blood lead level, began in 1995.)

The employer interview is also conducted to assess the employer's awareness of the lead hazard and compliance with the applicable OSHA lead standard. The interview is followed by a mailing of educational materials on lead hazard identification and control technologies, and on OSHA standards, where appropriate.

Selected workplaces are evaluated on-site by NJDHSS industrial hygienists. Out-of-state employers are referred to health departments in their respective states, primarily in New York and Pennsylvania. Under a Memorandum of Understanding with federal OSHA that went into effect in 1991, private sector employers in New Jersey identified by workers with significantly elevated blood lead levels can be referred to OSHA for regulatory action. Until 1995, employers were referred to OSHA when an employee was reported with a blood lead level of at least 50 µg/dl; thereafter, a level of 40 µg/dl has triggered the referral. Employers may be re-referred to OSHA if employees continue to be reported with elevated blood lead levels.

Results

Lead Exposure Status: New Jersey Companies

Four hundred twenty-four of the 495 work sites ever identified by an employee blood lead report were located in New Jersey, of which 181 (43%) were known to be in operation and having the potential to expose co-workers to lead as of December 1996.
Another 195 (46%) of the 424 sites had gone out of business, moved out of state, or discontinued lead use some time between 1986 and 1996, and 48 (11%) employers claimed that their air lead levels were below the OSHA action level or their employees' blood lead levels were below the reportable level. (Table 8)

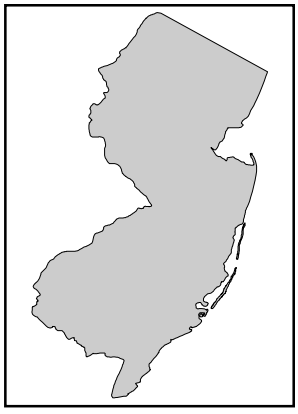

Table 8
Operational Status of New Jersey Lead Companies by Industry
December 31, 1996

Status	Manufacturing		Construction		Other		Total	
In operation - presumed or confirmed lead exposure	58	(37%)	76	(51%)	47	(40%)	181	(43%)
In operation - air levels below OSHA action level	13	(8%)	2	(1%)	8	(7%)	23	(5%)
In operation - BLL<25 g/dl	14	(9%)	4	(3%)	7	(6%)	25	(6%)
Out of business, moved out of state, no longer using lead	73	(46%)	66	(45%)	56	(47%)	195	(46%)
Total	158	(100%)	148	(100%)	118	(100%)	**424**	**(100%)**

Interventions

Between 1986 and 1996 the NJDHSS conducted 55 site visits. Seventeen of these sites were subsequently referred to OSHA. Thirty-four employers were referred to OSHA without NJDHSS on-site evaluation. Two other sites were evaluated by NIOSH under their "Technical Assistance" Program. Eighty five work sites with workers' blood lead levels <40 µg/dl received an educational mailing and an interview but no on-site evaluation by NJDHSS or OSHA referral.

Results of OSHA Referrals

Of the 51 employers referred to OSHA, seven (14%) work sites were already being inspected by OSHA. OSHA conducted 33 on-site inspections in response to NJDHSS referrals. (Table 9)

Table 9
OSHA's Disposition of Referrals from NJDHSS of Lead Using Companies

Action by OSHA	Number
Inspection conducted in response to NJDHSS referral	33
OSHA inspection already conducted	7
OSHA sent letter to company	4
No record of company in OSHA files*	4
OSHA tried but could not conduct inspection for various reasons (company closed, unable to find, etc)	3
Total	**51**

*Includes one referral to NY and one to PA

Citations for violations of OSHA standards were issued for 25 of the 33 referral inspections; the number of violations ranged from two to 53 with an average of 17 per employer. (Table 10) Proposed penalties for violations ranged from less than $10,000 to $199,770 per employer. Five (15%) of the sites with violations had proposed penalties greater than $50,000, 12 (36%) were between $10,000 and $50,000, and the remainder (16/48%) were less than $10,000. Twelve employers were referred again following the initial referral because of continuing reports of employees' blood lead levels ≥40 µg/dl.

Table 10
OSHA Referral Inspections: Cited Violations

Range of Frequency	Number of Employers
No citations	8
Less than 10 citations	11
10-19 citations	5
20-39 citations	7
40 citations or more	2
Total	**33**

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Reporting

Eleven years of occupational lead registry data from the ABLES system indicate that fewer workers with blood lead levels greater than the reporting level of 25 µg/dl were reported by laboratories in more recent years, and that the proportion of those tested who had significantly elevated levels (i.e. ≥40 µg/dl) had also declined. Data from other state occupational lead registries have displayed trends similar to those in New Jersey.[7]

Follow-up with the major clinical laboratories has indicated that the declines are real and not a reflection of decreased compliance by the laboratories with reporting requirements. The decline could indicate better control of lead exposure in industry, or, alternatively, less compliance by employers with blood lead testing requirements in OSHA standards. This decline could also be due to a decrease in employment in lead-using industries. Additional research is needed to explore these alternative hypotheses fully. Laboratory reporting of all blood lead reports, rather than just those ≥25 µg/dl will help to answer the question why fewer workers are reported by laboratories in more recent years. A rule to require full reporting has been proposed and is expected to go into effect in April 1998. Electronic reporting is being planned for 1998 following publication of the rule. This rule covers reporting of blood lead levels in children to the Department's childhood lead poisoning prevention program as well as reporting of adults to the occupational lead registry.

Exposure to lead has been a problem with steel structures such as bridges and water towers, not only for workers doing paint removal prior to repainting, but also for residents in communities next to such structures. Contract specifications for control of lead hazards between the New Jersey Department of Transportation and their bridge repair contractors and the promulgation of the OSHA lead in construction standard in the early 1990's appear to have had a significant impact on the number of blood lead reports and blood lead levels of construction workers. Reporting of blood lead levels from construction was at its peak in 1993, but where 46% of cases reported in 1993 had a peak blood lead level of 40 µg/dl or greater, this proportion declined to 23% in 1996.

Case Follow-up

Consistent with employment patterns in heavy industry and construction in general, most of the interviewed workers were male and under age 55. Minorities were over represented (31%) in the group of workers who were interviewed compared to the overall New Jersey working population, which is approximately 19.5% minority. Among

interviewed workers 46% were members of unions unlike overall employment, where 22% of the work force is unionized. Union membership provides additional opportunities for intervention and education.

The results of interviews suggest that workers need education about the hazards of lead exposure and need enforcement of proper work practices, especially not eating or smoking in work areas and consistent use of respiratory protection. Almost half of those interviewed noted that they cleaned their work clothes at home. A study of the potential for contamination at home and its impact on families of New Jersey construction workers reported to the ABLES system was recently published.[8,9]

Only half of those interviewed had seen a physician about their elevated blood lead level, and a majority (51%) among those saw a physician who was not specialized in occupational medicine. As for treatment, 48% of those seeing a physician indicated "none" for type of treatment received. In an analysis of interviews of physicians whose patients were reported to the ABLES system in the early 1990's with blood lead level ≥50 µg/dl, the NJDHSS reported that medical follow-up on workers may not have been adequate to prevent lead poisoning in those workers and their co-workers.[10]

The interviews covered only cases reported with blood lead level ≥40 µg/dl. As such, this group is not representative of all workers in the ABLES system or of all workers exposed to lead. Nevertheless, data gathered about the conditions of lead exposure at work sites of interviewed individuals have contributed to the development of intervention strategies such as those targeting workers with young children for the "take home toxins" message. In addition, the interviews afforded an opportunity to inform and educate.

Workplace Intervention

Follow-up with employers over the 11-year period found that 46% of the New Jersey work sites ever identified by a case report went out of business, moved out of state, or no longer used lead. Nevertheless, new companies continued to be identified by the system each year. Procedures are in place to respond quickly to newly identified companies to determine the magnitude of the lead hazard and take appropriate action.

A regulation for implementation of a 1993 law requiring licensing of lead abatement workers and certification of lead abatement contractors, regarding abatement of lead-based paint on steel structures and in commercial buildings, became effective July 21, 1997 (N.J.A.C. 5:17), and became fully operational in December 1997. An increase in lead abatement of steel structures and commercial buildings is expected with this new

group of certified contractors, which may have an impact on ABLES by increasing the number of blood lead reports from this part of the construction industry.

Collaborative efforts have been undertaken with other agencies in the state that are responsible for implementation of the law, including pilot industrial hygiene evaluations at selected lead abatement sites by NJDHSS staff.

Referral to OSHA resulted in a significant number of major enforcement actions. Proposed penalties reached almost $200,000 for one employer. Ten (31%) of the 33 employers who were inspected by OSHA as a result of the referral, including three of the five who were fined more than $50,000, had never been inspected previously by OSHA for any reason, according to OSHA's computerized inspections database that is available on the Internet.

Conclusion

Reporting of workers with elevated blood lead levels are sentinel health events that are critical to effective surveillance and timely workplace interventions. Apparent reductions in the numbers of reports and average blood lead levels in recent years should not result in complacency. Results of OSHA inspections, data from interviews of workers with elevated blood lead levels, and continued reporting of seriously elevated blood lead levels from some work sites indicate that ongoing vigilance is essential. Of particular concern is the control of lead exposure in the lead abatement industry.

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